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the above-titled brochure bids fair to pass the standard set by the various other English Monographs of recent years. All the known species of Petrels, Shearwaters and Albatrosses will be dealt with in the completed work, so that for this Order of birds it becomes our standard text. The first part treats of 24 species of the Genera Procellaria, Halocyptena, Oceanodroma, Oceanites, Garrodia, Pelagodroma, Pealea, and Cymodroma. Of these the Genus Oceanodroma is the only one represented on the western coast of North America north of the Mexican boundary, and, moreover, it is the largest Genus, containing no less than thirteen recognized species.

Leucorhoa, beali, beldingi, keadingi, macrodactyla, melania, homochroa, monorhis (=the *socorroensis* of our lists), *hornbyi*, and *furcata* are the species of Oceanodroma accredited to the eastern north Pacific. *O. hornbyi* continues to be known only from the type specimen now in the British Museum, and "said to have been obtained in the seas off the north-western coast of America." Mr. Godman evidently resents the action of the A. O. U. Committee in placing the species on the Hypothetical List, "as if the correctness of the habitat were not credited." But he further says, "unfortunately, after the manner of the times, no original label was attached to the specimen." However, until the species is rediscovered, it seems to us the course of the A. O. U. Committee is best followed. The lately described *O. monorhis chapmani* as well as the older *O. socorroensis* are both considered by the author as identical with the *O. monorhis* of Swinhoe, described in 1867 from China, thus giving the species an extremely wide range. Mr. Godman seems to have taken great pains in working over the literature of the subject and presenting the reader with selected biographical and exact distributional data. The beautiful hand-colored plates are perhaps the most attractive feature of the work.—J. G.

GEOGRAPHIC VARIATION IN BIRDS, WITH ESPECIAL REFERENCE TO THE EFFECTS OF HUMIDITY by C. WILLIAM BEEBE, Curator of Birds, New York Zoological Park (*Zoologica: N. Y. Zool. Soc.*, Vol. I, No. 1, September 25, 1907; 41 pages, 6 figures.)

Mr. Beebe first takes up the historical phase of the subject, giving quotations from many eminent biologists who have studied geographic variation. Several of these quoted statements are diametrically opposed to one another, and the reader is left with the impression that the subject is as yet largely theoretical. The consensus of opinion seems to be, however, that humidity does affect the color of animals, those in the more humid parts of the earth being as a rule darker than those in the arid regions. Many interesting examples of

the supposed effect of humidity on coloration are cited, and these bear out well the above statement.

Dichromatism is discussed in the second division of the paper. In several cases, for instance in *Gallinago gallinago* and *Chen hyperboreus*, the dark phase is shown to inhabit a restricted and humid locality, whereas the light phase is more migratory and is widely distributed. This is also the case with the Black Hawk, the dark phase of the Rough-legged Hawk; but when dichromatism in the Jaegers is taken into account, no geographical explanation is possible, since the "distinction depends neither on age, sex, or season," and light birds frequently mate with those in the dark phase. *Felis onca*, the South American jaguar, and *Felis pardus*, the leopard of Asia, present instances of dark individuals in the more humid portions of their respective countries; in the Mountain Sheep of the western United States black individuals are frequently seen, tho moisture in this case could have nothing to do with it. In conclusion the author says that these points will be cleared up only by the study of ecological conditions surrounding the species in question, and by experimentation on individuals "with climatal factors modified."

More problems are presented by Part III, which considers the subject of sporadic melanism. Several examples are given and discussed.

Part IV and V deal with experiments carried on by Mr. Beebe himself. Three young Wood Thrushes, *Hylocichla mustelina*, were taken from a nest and brought up by hand. Two of the birds lived long enough for the completion of a satisfactory experiment. One was kept in an outdoor aviary where conditions were as nearly normal as possible, while the other was confined in a superhumid atmosphere. This bird had not quite completed its second annual molt when it died. It showed a very marked darkening of the breast and side feathers, with a "tendency toward albinism" in the primaries and rectrices, whereas the outdoor bird was to all appearances in perfectly normal plumage.

Two White-throated Sparrows were treated in a like manner. At the end of three years the plumage of the indoor bird was "melanistic to an extreme degree," while that of the other was normal.

Similar experiments carried on with *Scardafella inca*, the Inca Dove, are considered in Part V. At the outset the geographical modifications of the wild genus *Scardafella* as it is traced from Arizona and Texas south thru Mexico to Brazil are considered. When a typical *Scardafella inca* is confined six months before the annual postnuptial molt, and exam-

ined after it has taken place, a slight darkening of the new feathers is noticeable. "A radical change in the pigmentation of the plumage takes place with each succeeding molt." The darkening seems to parallel the coloration of the wild species; that is, after the first molt the bird is similar to the wild *Scardafella inca di-leucos*, which inhabits Honduras and Nicaragua. Later molts bring the subject in line with *Scardafella ridgwayi* of Venezuela and Brazil. Finally it became so dark that there is no wild species with which it may be compared. In the birds experimented on a steady increase of melanin, both in the feathers and in the choroid coat of the eye, takes place until finally no white feather areas at all are left. Many wild genera of tropical doves are characterized by an iridescence of the wing coverts and inner secondaries. A remarkable feature of the color change of Mr. Beebe's subjects is the appearance of iridescence upon these feathers as a certain stage of melanin concentration is reached.

In discussing the results of his experiments, the author considers the following subjects, Significance in Respect to Direction of Evolution, Correlation with Natural Selection, Correlation with Taxonomy, and Correlation with Organic Selection.

The doves or *Columbiformes* are for the most part tropical in distribution, and it is probable that those which range farther to the north are tropical in origin. Since in these experiments the color characters assumed are progressively parallel to species farther toward the tropics, we apparently have an instance of "reversal of the direction of evolution." As the "recapitulation follows the same lines as in related genera of doves", and the details of change are identical in several individuals, Mr. Beebe decides that his work supports the orthogenetic hypothesis. He says that *acquired* and *inherited* characters should be clearly distinguished. The experiments here recorded show that the *Scardafella* specific differences are merely ontogenetic, or acquired characters.

"Mutation and natural selection have no place in these experiments." Still Mr. Beebe is led to the conclusion that natural selection is important in nature. For example, if the white color of Arctic animals is purely the result of environmental modification of pigment production "why does not the snowy owl change in summer like the ptarmigan", and why do some mammals remain dark thruout the year, while others are white at certain seasons? Natural selection probably comes continuously into play, modifying the direct climatal effect in accordance with the needs of each species. The rapid response to environment recorded in these experiments is likely to shake the ideas of "gradual evolution" and

"long-continued action of environing conditions upon the whole organism."

The writer thinks that it would be unreasonable to discard species whose distinctive characters are found to be merely acquired, for often there is a geographical hiatus between the species, and other differences, for instance in habits, would be swamped under one name.

"Any correlation of the results outlined in the present paper with the various theories of evolution must be tentative in the present state of our knowledge." This point we think should be emphasized, for when an individual of a wild species is experimented upon in confinement the fine adjustments of nature are broken down, and many subtle influences we do not now understand may be taken from it or brought to bear upon it, perhaps wholly obscuring the truly significant features. Mr. Beebe asserts that his experiments seemingly support the theory of organic selection; he gives as a possible adaptive character the presence of increased pigment in epidermal structures in a hot moist climate—adaptive in that this pigment absorbs the irritating ultra-violet rays of light. Compared with animals of the arid deserts, however, animals in the hot, moist, and therefore cloudy climates receive comparatively little light, and we should expect the former would exhibit the most abundant epidermal pigment supply! The following proposition seems justifiable, however, "if a new character, ontogenetically acquired, is in any way adaptive, it might easily be the means of preserving the species until phylogenetic variation had impressed it upon the race."

The paper constitutes one more step toward the placing of experimental biology upon a basis of importance in research work on the great problems of the science. The impression left on the reviewer, however, is that of the exploitation of the unknown rather than addition to the known.—*Walter P. Taylor.*

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

JANUARY.—The regular annual meeting for the election of officers of the Northern Division of the Cooper Club was held at the Chamber of Commerce, corner of Twelfth and Franklin Streets, Oakland, Saturday evening, January 11, 1908.

Preceding the business session Mr. Edw. W. Gifford, assistant Curator of Ornithology in the Academy of Sciences, San Francisco, spoke on "The Restoration of the Academy Collection." Mr. Gifford referred to the good fortune of the Academy in receiving the collections of the Beck Expedition after the fire, thus